

## PATENT ABSTRACTS OF JAPAN

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(21)Application number : 11-349755

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(22)Date of filing : 09.12.1999

(72)Inventor : ITO NOBUTO

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### (54) INK, PRINTED PRODUCT AND ITS PREPARATION PROCESS

#### (57)Abstract:

PROBLEM TO BE SOLVED: To provide an ink, etc., having a practical fastness which may form a reflective structure wherein reflective points of different colors are spotted on a printing surface.

SOLUTION: This ink is prepared by mixing a spectral reflective flake with a thickness of 7 to 20  $\mu\text{m}$  and a surface area of 2,000 to 15,000  $\mu\text{m}^2$  which has spectral diffraction gratings embossed on its surface and also a reflective coating, with a crosslinkable resin ink vehicle. The spectral reflective flake used here is obtained e.g. by subjecting a PET film to a hologram treatment through embossing ( $\geq 44,000$  lines/inch), preparing a hologram film by forming a reflective coating through aluminum deposition, etc., and cutting this film. Here, the crosslinkable resin ink vehicle is used to surely fix the flakes onto the printing surface with a high fastness.

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### LEGAL STATUS

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**CLAIMS**

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[Claim(s)]

[Claim 1] Ink characterized by coming to mix the part light reflex nature flake which it is the flake of 2 the thickness of 7-20 micrometers, and the surface area of 2,000-15,000 micrometers, and the part optical diffraction grid was embossed by the front face, and gave the reflective coat further, and a cross-linking resin ink vehicle.

[Claim 2] Ink according to claim 1 characterized by said ink vehicle being what consists of cross-linking resin, a cross linking agent, and a solvent.

[Claim 3] Ink according to claim 1 characterized by being the ultraviolet curing vehicle with which said ink vehicle contains polyfunctional oligomer or a monomer.

[Claim 4] The printing product characterized by coming to print the ink of a publication with a dark color layer to either of claims 1-3 in piles.

[Claim 5] The manufacture approach of the printing product characterized by screen-stenciling the ink of a publication through the screen of 50-150 meshes to either of claims 1-3.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the manufacture approach of the printing product using the ink used in order to give fanciness to the candidate for printing, and this ink, and a printing product.

[0002]

[Description of the Prior Art] Conventionally, the pigment of light-scattering nature, such as a pearl pigment, is used for a coating or ink, and it is used for giving special fanciness.

[0003] However, the flake of a pearl pigment has the property of reflecting the light of specific wavelength, only corresponding to a view visual direction. Therefore, when view \*\* of the printing side where pearl pigment content ink was printed is carried out from a certain direction, all the flakes of a printing side have the same brightness, and the light of specific wavelength is reflected in an eye direction. Therefore, the whole printing side is sensed visual to reflect in field. Therefore, it was inadequate for being able to form neither reflex voice by which a printing side is dotted with a reflective spot, nor the reflex voice from which the color of each reflective spot differs, but corresponding to ornamental diversification by printing.

[0004]

[Problem(s) to be Solved by the Invention] therefore, the purpose of this invention is to offer the manufacture approach of ink with the practical use resistance which can form the reflex voice from which it is the reflex voice by which a printing side is dotted with a reflective spot, and the colors of each reflective spot differ, and it is alike and dependent on a viewing angle, and a color differs, a printing product, and a printing product.

[0005]

[Means for Solving the Problem] In order to solve said technical problem, this invention is the flake of 2 the thickness of 7-20 micrometers, and the surface area of 2,000-15,000 micrometers, and a part optical diffraction grid is embossed by the front face, and it offers the ink characterized by coming to mix the part light reflex nature flake which gave the reflective coat further, and a cross-linking resin ink vehicle.

[0006] The part light reflex nature flake used by this invention carries out hologram processing for example, of the PET film by embossing (44,000 or more lines / 1 inch), gives a reflective coat by aluminum vacuum evaporation etc., creates a hologram film, cuts this and is obtained.

[0007] At this time, it may be it hard to emboss a part optical diffraction grid on that front face that the thickness of a flake is less than 7 micrometers, when it prints, it may be crushed, or it may be bent. Moreover, if the thickness of a flake exceeds 20 micrometers, irregularity will arise in a printing side and a smooth printing side will not be acquired. If the thickness of a flake is 7-20 micrometers, it is easy to form embossing of a part optical diffraction grid, and there are no flake crushing and bending at the time of printing, and a smooth printing side can be formed.

[0008] Moreover, the reflected light of each flake cannot be dotted with the naked eye as the surface area of a flake is less than [ 2,000 micrometers ] two, and it cannot catch, but it becomes difficult to form reflex voice by which a printing side is dotted with a reflective spot. Moreover, if the surface area

of a flake exceeds 2 [ 15,000-micrometer ], printing to the printed side of a flake will become difficult. Therefore, as for the surface area of a flake, it is desirable that 2,000-15,000 micrometers is 2, when forming reflex voice by which a printing side is dotted with a reflective spot and securing the printing nature of a flake.

[0009] However, in the non-cross-linking resin vehicle, it was also discovered by it becoming clear that practical use cannot be presented, since it is difficult to fix the flake of said thickness and surface area to a printed side with sufficient resistance, and using a cross-linking resin ink vehicle in this invention that a flake can be certainly fixed to a printed side with sufficient resistance.

[0010] Said cross-linking resin ink vehicle consists of cross-linking resin, a cross linking agent, and a solvent. Here, although shown in claim 2 as cross-linking resin, as an example, the epoxy resin which has a functional group, acrylic polyol resin, saturated polyester resin, etc. can be mentioned, and as a cross linking agent, the poly amino cross linking agent, an isocyanate cross-linking agent, etc. can be mentioned.

[0011] Moreover, as a solvent, the boiling point can mention \*\* 250 degrees C or less above 100 degrees C preferably by organic solvents, such as a ketone system, an ether system, an ester system, and an aromatic hydrocarbon system.

[0012] Moreover, although shown in claim 3 as cross-linking resin, while many organic functions or monofunctional polyurethane acrylate, polyester acrylate, polyether acrylate, epoxy acrylate, etc. are used as photoreaction nature oligomer as an example, a well-known photoreaction nature diluent may be used.

[0013] As a photoreaction nature diluent, long-chain aliphatic series acrylate, allyl compound acrylate, Benzyl acrylate, butoxy ethyl acrylate, butanediol monoacrylate, t-butylamino acrylate, caprolactam acrylate, hydroxypropyl acrylate, Cyano ethyl acrylate, cyclohexyl acrylate, cyclo PENTA nil acrylate, N and N-diethylamino ethyl acrylate, 2-ethoxyethyl acrylate, A grotesque cello-RUAKURI rate, glycidyl acrylate, isoboronyl acrylate, An isodecyl ARUA chestnut rate, iso octyl acrylate, laurylacrylate, Morpholine acrylate, phenoxy acrylate, EO denaturation phosphoric-acid acrylate, EO denaturation phthalic-acid acrylate, polyethylene-glycol acrylate, Polypropylene-glycol acrylate, stearylacrylate, Vinyl acetate, acrylic-ized isocyanate, bisphenol A diacrylate, EO denaturation bisphenol A diacrylate, EO denaturation bisphenol F diacrylate, 1,4-butanediol diacrylate, 1, 3-butylene-glycol diacrylate, Cyclo PENTA nil diacrylate, diethylene glycol diacrylate, EO denaturation diethylene glycol diacrylate, dipentaerythritol hexaacrylate, Alkyl denaturation dipentaerythritol tetraacrylate, alkyl denaturation dipentaerythritol triacrylate, KAPURORATAMU denaturation dipentaerythritol hexaacrylate, ditrimethylolpropanetetraacrylate, ECH denaturation ethylene glycol diacrylate, glycerol acrylate, An ECH denaturation glycerol thoria chestnut rate, 1,6-hexanediol diacrylate, Long-chain aliphatic series diacrylate, ethoxylation cyclohexyl diacrylate, Neopentyl glycol diacrylate, a pentaerythritol thoria chestnut rate, Pentaerythritol tetraacrylate, EO denaturation phosphoric-acid diacrylate, EO denaturation phosphoric-acid thoria chestnut rate, ECH denaturation phthalic-acid diacrylate, POCHIECHIREN glycol diacrylate, polypropylene-glycol diacrylate, Tetraethylene glycol diacrylate, triethylene glycol diacrylate, Triethylene glycol divinyl ether, triglycerol diacrylate, Neopentyl glycol denaturation trimethylolpropane triacrylate, Trimethylolpropane triacrylate, EO denaturation trimethylolpropane triacrylate, PO denaturation trimethylolpropane triacrylate, ECH denaturation trimethylolpropane triacrylate, Tripropylene glycol diacrylate, tris (acryloxyethyl) isocyanate, caprolactam denaturation tris (acryloxyethyl) isocyanate, and the thing from which these acrylate parts became methacrylate are used.

[0014] When especially an ultraviolet curing vehicle is used, while fixable [ over the printed side of a flake / outstanding ] is acquired, there is also no effect on the environment by the solvent, and printing speed is also quick.

[0015] Moreover, the printing product concerning this invention comes in piles to print the ink which comes to mix the aforementioned part light reflex nature flake and a cross-linking resin ink vehicle with a dark color layer.

[0016] the ink which prints black ink on the front face of a base material 1, forms the black printing

layer 2, and is specifically applied on this black printing layer 2 at this example as shown in drawing 1 -- printing -- a spectrum -- a reflecting layer 3 is formed -- both -- this -- a spectrum -- the clear layer 4 is formed on a reflecting layer 3. In this case, the direction which goes to the clear layer 4 from the upper part sees, and it becomes a visual direction A. In addition, there may not be the clear layer 4.

[0017] moreover, the ink applied to the rear-face side of a bright film 5 at this example as shown in drawing 2 -- printing -- a spectrum -- a reflecting layer 3 is formed -- both -- this -- a spectrum -- tone ink is printed and the dark color ink printing layer 6 is formed in the rear-face side of a reflecting layer 3. In this case, the direction which goes to a bright film 5 from the upper part (front-face side) sees, and it becomes a visual direction A.

[0018] Thus, since the reflected light from a printed side decreases by printing in piles with the black printing layer 2 and the dark color ink printing layer 6 which are a dark color layer, in reflex voice which is dotted with the reflective spot mentioned above, the brightness of a reflective spot can be raised visually, it can shine, and admiration can be generated.

[0019] Here, since a part optical diffraction grid is embossed by the front face and a flake gives a reflective coat, when each printed flake is seen from a certain direction, the wavelength of the reflected light is not the same, makes the reflected light of proper wavelength amplify for every flake, and is reflected. Therefore, in reflex voice which is dotted with the reflective spot mentioned above, the color of the reflected light from each reflective spot is various. Therefore, the reflex voice from which it is the reflex voice which is dotted with a reflective spot, and the color of each reflective spot differs will be formed.

[0020] Although it is suitable ink for screen-stencil, when the ink concerning this invention has much mesh, a possibility that a flake may remain is on a mesh. Therefore, the manufacture approach of the printing product concerning this invention prints said ink through the screen of 50-150 meshes.

[0021]

[Example] Hereafter, the example of this invention is explained.

Although various kinds of resin can be used in example 1 solvent mold ink, the ink for screen-stencil of the following components in which especially the adhesive property used the saturated polyester resin in which the reinforcement of a paint film was well excellent is the optimal. In addition, in each following example of combination, a unit is the weight section.

Part light reflex nature flake (12 micrometers in thickness, surface area 5,000micrometer<sup>2</sup>) ... 10 [0022]

Saturated polyester resin ... 25 Cyclohexanone ... 20 Aromatic hydrocarbons solvent ... 44 Additive (silicon system defoaming agent) ... 1 Isocyanate (cross linking agent) ... 5 [0023] Manufacture of actual ink adds and agitates a part light reflex nature flake to the resin varnish obtained by dissolving saturated polyester resin in a solvent, and prepares ink for it. Addition churning of the isocyanate resin (cross linking agent) required for this is carried out, and it considers as printing ink.

[0024] In the prepared ink, with the screen version of 100 mesh of Dacron \*\*, flesh-side printing was performed to transparent polyester film with a thickness of 188 micrometers, and this was dried 80 degrees C for 30 minutes. Besides, the Japanese ink ink of the same resin system was printed in piles, this was dried 80 more degrees C for 30 minutes, and printed matter was created. this printed matter -- a pawl -- although examined by scratching, it did not exfoliate but adhesion was good.

[0025] Moreover, although put in the break of 1mm angle in a grid pattern by the cutter, adhesive tape was stuck on this, this was pulled apart rapidly and the adhesive trial was performed, the ink of this example did not exfoliate and the adhesive property ("adhesive tape resistance" of Table 1) was good. Moreover, this was also clear although the effectiveness (reflex voice from which it is the reflex voice by which a printing side is dotted with a reflective spot, the color of each reflective spot differs, and a color differs depending on a viewing angle) of a hologram was checked from the front face.

[0026]

Example 2-minute light reflex nature flake (12 micrometers in thickness, surface area 5,000micrometer<sup>2</sup>) ... 20 [0027]

Urethane system acrylate ... 35 Vinyl system monomer ... 20 2 organic-functions monomer ... 25 Photoinitiator ... 5 Sensitizer ... 3 [0028]

Additive (silicon system defoaming agent) ... 2 [0029] The screen version of 100 mesh of Dacron \*\* performed flesh-side printing to transparent polyester film with a thickness of 188 micrometers, and the prepared ink was made to harden this through the black light of Wx802 LGTs with 10m speed for /. The Japanese ink ink of the same resin system performed the overprint to this, and printed matter was created. Although the adhesive property and the result were checked, it was good like the example 1.

[0030]

Example part light reflex nature flake of a comparison (12 micrometers in thickness, surface area 5,000micrometer<sup>2</sup>) ... 10 [0031]

Saturated polyester resin ... 25 Cyclohexanone ... 20 Aromatic hydrocarbons solvent ... 44 Additive (silicon system defoaming agent) ... 1 [0032] In solvent mold ink, printing desiccation was performed like the example 1 without adding a curing agent, and it considered as the example of a comparison. As shown in a table, the fault with which it is hard to present practical use has been checked.

[Table 1]

	インキタイプ	爪引っ掻き耐性	粘着テープ耐性	仕上がり
実施例1	溶剤型 2液	○	○	○
実施例2	紫外線硬化型	○	○	○
比較例	溶剤型 1液	×	×	○

[0033]

[Effect of the Invention] As explained above, reflex voice by which a printing side is dotted with a reflective spot according to this invention, and the reflex voice from which the color of each reflective spot differs can be formed, and therefore, it can respond to ornamental diversification by printing. Moreover, even if it copies, this reflex voice cannot be reproduced, but therefore, the forged prevention effectiveness and the alteration prevention effectiveness can also be acquired from becoming the reflex voice from which the color of a reflective spot differs according to a view visual direction.

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EFFECT OF THE INVENTION

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**TECHNICAL PROBLEM**

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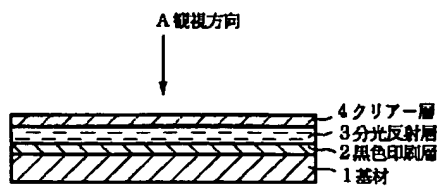
[Problem(s) to be Solved by the Invention] therefore, the purpose of this invention is to offer the manufacture approach of ink with the practical use resistance which can form the reflex voice from which it is the reflex voice by which a printing side is dotted with a reflective spot, and the colors of each reflective spot differ, and it is alike and dependent on a viewing angle, and a color differs, a printing product, and a printing product.

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[Translation done.]

Drawing selection drawing 1 

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MEANS

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[0006] The part light reflex nature flake used by this invention carries out hologram processing for example, of the PET film by embossing (44,000 or more lines / 1 inch), gives a reflective coat by aluminum vacuum evaporation etc., creates a hologram film, cuts this and is obtained.

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[0008] Moreover, the reflected light of each flake cannot be dotted with the naked eye as the surface area of a flake is less than [ 2,000 micrometers ] two, and it cannot catch, but it becomes difficult to form reflex voice by which a printing side is dotted with a reflective spot. Moreover, if the surface area of a flake exceeds 2 [ 15,000-micrometer ], printing to the printed side of a flake will become difficult. Therefore, as for the surface area of a flake, it is desirable that 2,000-15,000 micrometers is 2, when forming reflex voice by which a printing side is dotted with a reflective spot and securing the printing nature of a flake.

[0009] However, in the non-cross-linking resin vehicle, it was also discovered by it becoming clear that practical use cannot be presented, since it is difficult to fix the flake of said thickness and surface area to a printed side with sufficient resistance, and using a cross-linking resin ink vehicle in this invention that a flake can be certainly fixed to a printed side with sufficient resistance.

[0010] Said cross-linking resin ink vehicle consists of cross-linking resin, a cross linking agent, and a solvent. Here, although shown in claim 2 as cross-linking resin, as an example, the epoxy resin which has a functional group, acrylic polyol resin, saturated polyester resin, etc. can be mentioned, and as a cross linking agent, the poly amino cross linking agent, an isocyanate cross-linking agent, etc. can be mentioned.

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EXAMPLE

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比較例	溶剤型 1液	×	×	○

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1] It is the type section Fig. showing the gestalt of 1 operation of this invention.

[Drawing 2] It is the type section Fig. showing the gestalt of other operations of this invention.

[Description of Notations]

1 Base Material

2 Black Printing Layer

3 Part Light Reflex Layer

4 Clear Layer

5 Bright Film

6 Dark Color Ink Printing Layer

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- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

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**TECHNICAL FIELD**

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[Field of the Invention] This invention relates to the manufacture approach of the printing product using the ink used in order to give fanciness to the candidate for printing, and this ink, and a printing product.

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[Translation done.]

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PRIOR ART

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[Description of the Prior Art] Conventionally, the pigment of light-scattering nature, such as a pearl pigment, is used for a coating or ink, and it is used for giving special fanciness.

[0003] However, the flake of a pearl pigment has the property of reflecting the light of specific wavelength, only corresponding to a view visual direction. Therefore, when view \*\* of the printing side where pearl pigment content ink was printed is carried out from a certain direction, all the flakes of a printing side have the same brightness, and the light of specific wavelength is reflected in an eye direction. Therefore, the whole printing side is sensed visual to reflect in field. Therefore, it was inadequate for being able to form neither reflex voice by which a printing side is dotted with a reflective spot, nor the reflex voice from which the color of each reflective spot differs, but corresponding to ornamental diversification by printing.

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[Translation done.]

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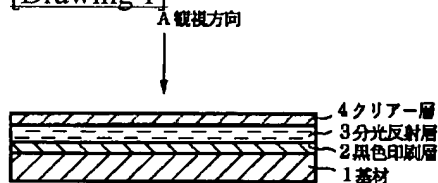
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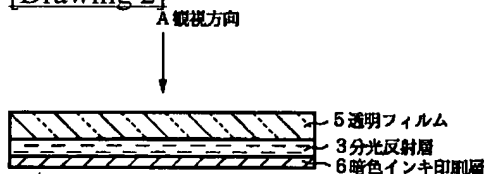
DRAWINGS

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[Drawing 1]



[Drawing 2]



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[Translation done.]

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**CLAIMS**

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[Claim(s)]

[Claim 1] Ink characterized by coming to mix the part light reflex nature flake which it is the flake of 2 the thickness of 7-20 micrometers, and the surface area of 2,000-15,000 micrometers, and the part optical diffraction grid was embossed by the front face, and gave the reflective coat further, and a cross-linking resin ink vehicle.

[Claim 2] Ink according to claim 1 characterized by said ink vehicle being what consists of cross-linking resin, a cross linking agent, and a solvent.

[Claim 3] Ink according to claim 1 characterized by being the ultraviolet curing vehicle with which said ink vehicle contains polyfunctional oligomer or a monomer.

[Claim 4] The printing product characterized by coming to print the ink of a publication with a dark color layer to either of claims 1-3 in piles.

[Claim 5] The manufacture approach of the printing product characterized by screen-stenciling the ink of a publication through the screen of 50-150 meshes to either of claims 1-3.

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[Translation done.]